

APPLICATION  
FOR  
UNITED STATES OF AMERICA

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SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

Be it known that We,

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and

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have invented certain improvements in

"SHOE WITH FOOT MASSAGING SOLE"

of which the following description in connection with the accompanying drawings is a specification, like reference characters on the drawings indicating like parts in the several figures.

The present invention relates to a shoe with foot massaging sole.

### BACKGROUND OF THE INVENTION

5 It is known that the foot has nerve endings that are connected to all the organs of the body, so that by acting with localized pressures it is possible to act so as to prevent or treat disorders that in particular cause painful states.

The technique of foot treatment has been known since antiquity and  
10 has been, and still is, widely used.

When there were no drugs for treating diseases, disorders or affections of various kinds, man sought natural remedies that could provide relief.

These means were found by instinct in a manipulation of the painful  
15 regions, developing a search for points that acted by reflex on the painful region.

It was thus discovered gradually that terminations, subsequently defined as nerve endings, were concentrated in the foot and, if stimulated, could transfer the stimulus to other organs of the body.

20 A reflex is an involuntary but so to speak automatic response to a stimulus that causes excitation of a sensitive neuron that transmits its action up to the cerebral level.

Every part of the body is a locus of these reflexes, but more active regions are present in the foot.

25 Figure 1 is a view of a sole of a foot, divided into four regions designated by the reference numerals A, B, C and D.

Region A contains the endings linked in particular to teeth, lymphatic circulation, eyes and ears; region B contains the endings linked to the gallbladder, liver, heart, bronchi, thyroid, and stomach; region C contains  
30 the endings linked to the intestine, colon, kidneys, vertebrae; and region D

contains the endings linked to the genitalia, to the meniscus and to the legs.

By stimulating one of these points, it is possible to have a beneficial effect on the various organs, as demonstrated by many medical studies in reflexology and zone massage.

5       Shoes are known which have a foot supporting insole provided with protrusions in various regions or constituted by a mat of small studs of various hardness.

In this case, this is a passive means, which produces a sort of massage whenever, by resting the foot, the sole of the foot bears onto the protrusions  
10 or on the studs.

The action is very limited, and for some sensitive individuals resting the foot on an insole with many protrusions is unpleasant or even painful.

### SUMMARY OF THE INVENTION

The aim of the present invention is to provide a shoe that massages  
15 the foot actively.

Within this aim, an object of the present invention is to provide a sole in which it is possible to adjust the massaging means by choosing the points of the foot to be affected.

Another object of the invention is to provide a sole in which it is  
20 possible to adjust the intensity of the massage and also deactivate it.

A further object is to provide a sole that can be applied to any type of shoe.

A still further object is to provide a sole with active massage means that do not require energy supply sources that deplete.

25       Another object is to provide a massaging sole in which said massaging means also provide internal ventilation.

Another object is to provide a massaging sole whose components are structurally simple and have a low cost.

This aim and these and other objects that will become better apparent  
30 hereinafter are achieved by a shoe with foot massaging sole, characterized

in that it comprises a tank, which is located preferably within the heel of the shoe sole, and a pump, which is located below the heel of the foot and is actuated by said heel of the foot while walking, said pump introducing air in said tank, which gradually increases its internal pressure, an air discharge  
5 duct branching out from said tank, an adjustable valve being interposed along said air discharge duct and opening when a preset pressure is reached, said valve feeding at least one elastic chamber provided with a plurality of studs, which are directed toward the sole of the foot and are inserted in corresponding holes provided in a foot supporting insole, said studs, when  
10 the air is discharged, protruding from said holes and acting on the sole of the foot, said outflowing air being conveyed, preferably by means of a tube, into the shoe and producing an internal ventilation.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the present invention will  
15 become better apparent from the following detailed description of some embodiments thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a plan view of the sole of a foot, divided into regions of different sensitivity;

20 Figure 2 is a longitudinal sectional view of the shoe according to the invention;

Figure 3 is a sectional view of some of the parts that compose the sole;

25 Figure 4 is an exploded perspective view of the parts that compose the sole;

Figure 5 is a sectional view of a part of the sole, illustrating the studs in the inactive condition;

Figure 6 is a sectional view of the sole of Figure 5, in which the studs protrude from the insole due to the pressure of the air;

30 Figure 7 illustrates, at the top, the chart of the increase in the air

pressure in the tank and of the discharge of said air from said tank, and, at the bottom, the pulsed pressure that acts on the studs.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

5 With reference to the figures cited in the introduction of the present description, Figure 1 has already been discussed.

With reference to Figures 2 and onward, a shoe, generally designated by the reference numeral 10, is composed of an upper 11, which is associated with a tread sole 12 provided with a heel 13.

10 A tank 14 is contained in the heel 13, and a pump 15, for example of the membrane type covered by a deformable insole 16, is provided above said tank.

Every time the pump 15 is compressed by the heel of the foot, and this occurs at each step, it introduces air in the tank 14.

15 Conveniently, the air can be drawn from the outside of the shoe, so as to be changed constantly.

It is in any case possible to draw the air contained in the shoe, although this does not produce air change.

The tank 14 is provided with a discharge duct 17, which is controlled by an adjustable valve 18.

20 The adjustable valve 18, in the case shown in Figure 4, has three outputs, and it is possible to select one or two or all of them by rotating for example a ring.

The valve 18 is also adjustable in terms of pressure, i.e., it opens at a chosen pressure when said pressure is reached inside the tank 14.

25 With reference to Figure 4, the three outputs, designated by the reference numerals 19, 20 and 21, are connected to three elastic chambers, designated by the reference numerals 22, 23 and 24 respectively, which are located, in the case shown, at the regions A, B and C of the sole of the foot, shown in Figure 1.

30 Each one of the elastic chambers 22, 23 and 24 is provided with a

discharge tube, designated by the reference numerals 25, 26 and 27 respectively; said tubes merge into a single additional tube 28, which preferably leads into the inside of the shoe 10.

The elastic chambers 22, 23 and 24 are constituted, as shown more clearly in Figures 5 and 6, which illustrate by way of example the elastic chamber 23, by a bag made of an elastic material, which is provided with a lower wall 29 and with an upper wall 30.

The upper wall 30 has a plurality of studs 31 that protrude upward, i.e., toward the inside of the shoe 10.

The studs 31 are located at a plurality of holes 32, which are provided in a foot supporting insole 33 that is superimposed on the elastic chambers 22, 23 and 24.

Each hole 32 has a taper 34, with the larger end downward, which allows, as shown in Figure 6, the elastic deformation of the upper wall 30 under the effect of the pressure of the internal air, so that the studs 31 exit from the holes 32, pressing in an impulsive manner against the sole of the foot.

Figure 7 illustrates two charts: the upper chart 35 plots the pressure of the air inside the tank 14, and the lower chart 36 plots the pressure inside the elastic chambers 22, 23 and 24.

In the tank 14, the pressure rises in steps 37, each of which corresponds to the compression of the heel, at each stride, on the pump 15.

The impulsive discharge of the tank 14, shown by the descending ramp 39, occurs once the pressure P1, which is designated by the reference numeral 38 and is the pressure set on the valve 18, has been reached.

Correspondingly, an impulsive pressure, designated by the reference numeral 40 in the chart 36, is generated inside the elastic chambers 22, 23 and 24 and pushes the studs 31 upward and therefore against the sole of the foot in the chosen region.

In this manner, the aim is achieved of having a foot massage obtained

in a manner that is active and not passive and is also adjustable.

The valve, which has been described with single-pulse discharge, can be of the sequential type, i.e., once a preset pressure is reached, the discharge occurs by means of a plurality of consecutive pulses until a low  
5 pressure that retriggers its closure is reached.

Such valve has a position in which it remains constantly open, and in this manner it is possible to exclude the foot massaging action completely.

Downstream of the valve it is possible to arrange a small tank, which contains fragrancing or sanitizing products to be replenished periodically.

10 These products are introduced in the shoe whenever the air that actuates the studs is discharged.

It is also possible to provide a further elastic chamber, which is arranged around the pump in the heel region, so as to also achieve massage of the part D, shown in Figure 1.

15 The pump can be a multiple pump, and the tank can be divided into as many parts as there are pump sections.

In this case, with a plurality of adjustable valves, it is possible to have a different action on the various parts of the sole of the foot.

From what has been described and shown, it is evident that all the  
20 intended aim and objects have been achieved, and that in particular a sole has been obtained which allows to obtain a foot massage in the chosen manner and with an adjustable action that the wearer of the shoe can thus choose according to his sensitivity.

The combined massaging and internal ventilation action allows to  
25 achieve an optimum condition for the foot and therefore a feeling of wellbeing for the wearer of the shoe.

It is obvious that starting from the same inventive concept, the sole can be provided in various manners and with various kinds of material, depending on the quality of the shoe to be provided.

30 The disclosures in Italian Patent Application No. PD2003A000176

from which this application claims priority are incorporated herein by reference.